



COMMERCIAL HOT WATER HEAT EXCHANGER INSTALLATION MANUAL





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INDEX

DESCRIPTION	PAGE
RATINGS AND DIMENSIONS	1
<u>INSTALLATION & RECOMMENDED PIPING</u>	
INSTALLATION WITH HOT WATER BOILERS	2
RECOMMENDED NEAR UNIT PIPING:	
- ONE H2OMAX UNIT	3
- MULTIPLE H2OMAX UNITS	4
RECOMMENDED PIPING WITH HOT WATER BOILERS:	
- (1) BOILER AND (1) HEAT EXCHANGER - HYDRONIC HEATING AND DOMESTIC HOT WATER (DHW)	5
- MULTIPLE BOILERS AND MULTIPLE HEAT EXCHANGERS - HYDRONIC HEATING AND DHW	6
ALTERNATIVE PIPING SCHEMATICS WITH HOT WATER BOILERS:	
- (1) BOILER AND (1) HEAT EXCHANGER - HYDRONIC HEATING, DHW AND BUFFERING	7
- (1) BOILER, (1) HEAT EXCHANGER & (1) STORAGE TANK - HYDRONIC HEATING, DHW AND BUFFERING	8
- (1) BOILER AND (1) HEAT EXCHANGER - HYDRONIC HEATING AND DHW	9
- (1) BOILER AND (2) HEAT EXCHANGERS - HYDRONIC HEATING AND DHW	9
INSTALLING ANTI-SCALDING VALVE	10
INSTALLATION WITH LOW PRESSURE STEAM BOILERS	11
RECOMMENDED PIPING SCHEMATIC WITH LOW PRESSURE STEAM BOILERS:	
- (1) BOILER AND (1) HEAT EXCHANGER - DHW	12
<u>MISCELLANEOUS</u>	
PRESSURE DROP DATA	13
CIRCULATOR SIZING CALCULATIONS	14
TROUBLESHOOTING	15
LIMITED WARRANTY	16

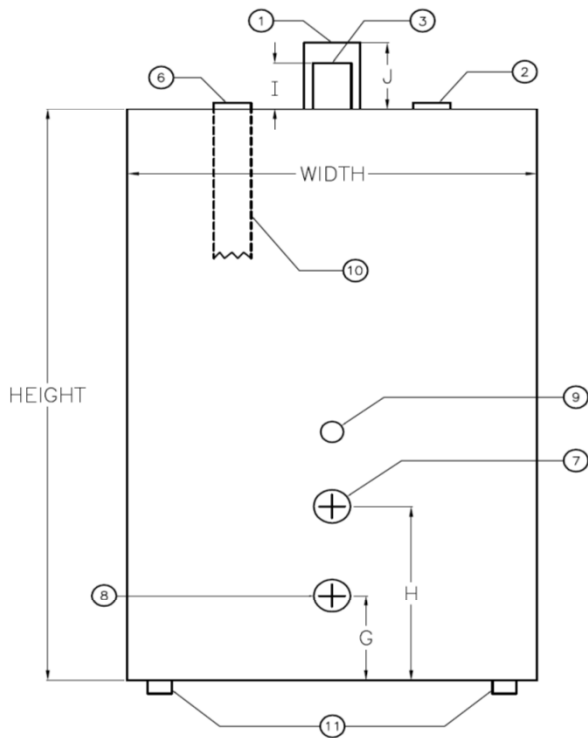
INSTALLATION INSTRUCTIONS

H2OMAX COMMERCIAL HOT WATER HEAT EXCHANGER

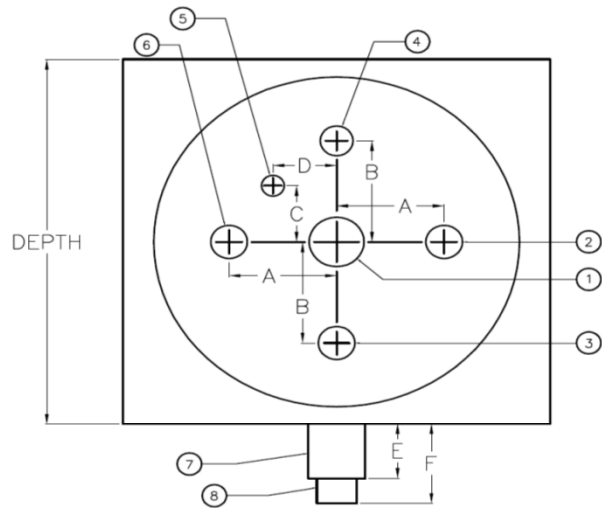
RATINGS AND DIMENSIONS

COMPONENT IDENTIFICATION

1. Hot Water Outlet
2. Hydronic System Supply
3. Boiler Water Supply
4. $\frac{3}{4}$ " Nipple for Safety Valve
5. $\frac{1}{2}$ " Coupling for T/P Gauge
6. Hydronic System Return
7. Cold Water Inlet
8. Boiler Water Return
9. Well for Aquastat
10. Diptube (included)
11. Adjustable Feet



Dimensions (inches)				
	H26	H48	H72	H119
A	5.00	5.50	7.00	8.00
B	4.00	7.50	9.00	10.00
C	3.25	5.75	6.00	7.00
D	3.25	5.75	6.00	7.00
E	2.50	4.00	5.00	7.00
F	3.00	5.50	6.50	9.00
G	2.00	2.25	2.50	2.50
H	9.00	12.00	12.50	13.70
I	2.50	4.00	5.00	7.00
J	3.00	5.00	6.50	9.00
Width/Depth	19.50	24.50	26.50	30.50
Height	42.00	45.00	49.00	60.00



Technical Data								
Models	Tank Volume (gal.)	Heat Transfer Area (sq. ft.)	Domestic Water Connections (in)	Boiler Water Connections (in)	Hydronic Connections (in)	MAWP Domestic (psi)	MAWP Boiler (psi)	Weight (lb)
H26	26	21	1.25	1.00	1.25	150	30	210
H48	48	26.2	1.50	1.25	1.25	150	60	375
H72	72	26.2	1.50	1.50	2.00	150	115	575
H119	119	47.1	2.00	2.00	2.00	150	115	800

Rev'd 7/25/16

INSTALLATION INSTRUCTIONS

H2OMAX COMMERCIAL HOT WATER HEAT EXCHANGER

INSTALLATION WITH HOT WATER BOILERS

ALL H2OMAX units must be installed vertically. Adjustable feet provided for leveling. Installation must conform to local code requirements.

PRESSURE RELIEF VALVE: Set at 30 psig.

DOMESTIC WATER CONNECTIONS (Copper): Cold incoming water piping from the domestic source installed in the bottom and hot outgoing water piping to the domestic application installed in the top; see tank labels.

BOILER WATER CONNECTIONS (Steel Pipes): Supply water piping from the boiler installed in the top and return water piping to the boiler installed in the bottom; see tank labels.

HYDRONIC CONNECTIONS (Space heating, if applicable): Supply water piping to the space heating application installed in the top, right of domestic hot water outlet connection, and return water piping from the space heating application installed in the top, left of the domestic hot water outlet connection. If space heating not being used, then connections should be capped /plugged. *However, when filling tank, these connections should be kept open and only capped/plugged when water has reached the top. This is to ensure that no air is trapped as this could cause corrosion over the long term.*

OPERATING CONTROL (Supplied by others): An aquastat or alternate control device that regulates water temperature and activates the circulator either directly or via the boiler control. All H2OMAX models are equipped with a dry well installed above the domestic cold water inlet for installation of aquastat bulb or temperature sensor. Set the control to the desired output temperature. ***** WARNING: WATER ABOVE 120°F CAN CAUSE SERIOUS INJURY. THE INSTALLATION OF AN ANTI-SCALD VALVE IS HIGHLY RECOMMENDED. SEE "ANTI-SCALD VALVE INSTALLATION".**

CIRCULATOR: Installed between the H2OMAX and boiler. Calculate circulator flow based on 20°F to 30°F boiler temperature differential. Refer to the H2OMAX pressure drop and circulator sizing info highlighted in this manual or contact the factory for more information. ***It is recommended that the circulator be installed on the boiler return between the H2OMAX and boiler.***

PRIORITY CONTROL (Supplied by others, if applicable): Domestic hot water will have "priority" over space heating when demand is called. In applications with above average hot water demand, this will increase the amount of hot water available.

BACKFLOW PREVENTER (Supplied by others): Some codes require the installation of a backflow preventer. In those cases, it should be installed in the domestic cold water incoming piping to the H2OMAX. A system containing a backflow preventer is considered a closed system and a pressure relief valve on the domestic water side may have to be installed.

ANTI-SCALD VALVE (Supplied by others): It is highly recommended to install an anti-scald (3-way mixing) valve with all H2OMAX systems. Anti-scald valves are mandatory in the Commonwealths of Massachusetts and Pennsylvania*.

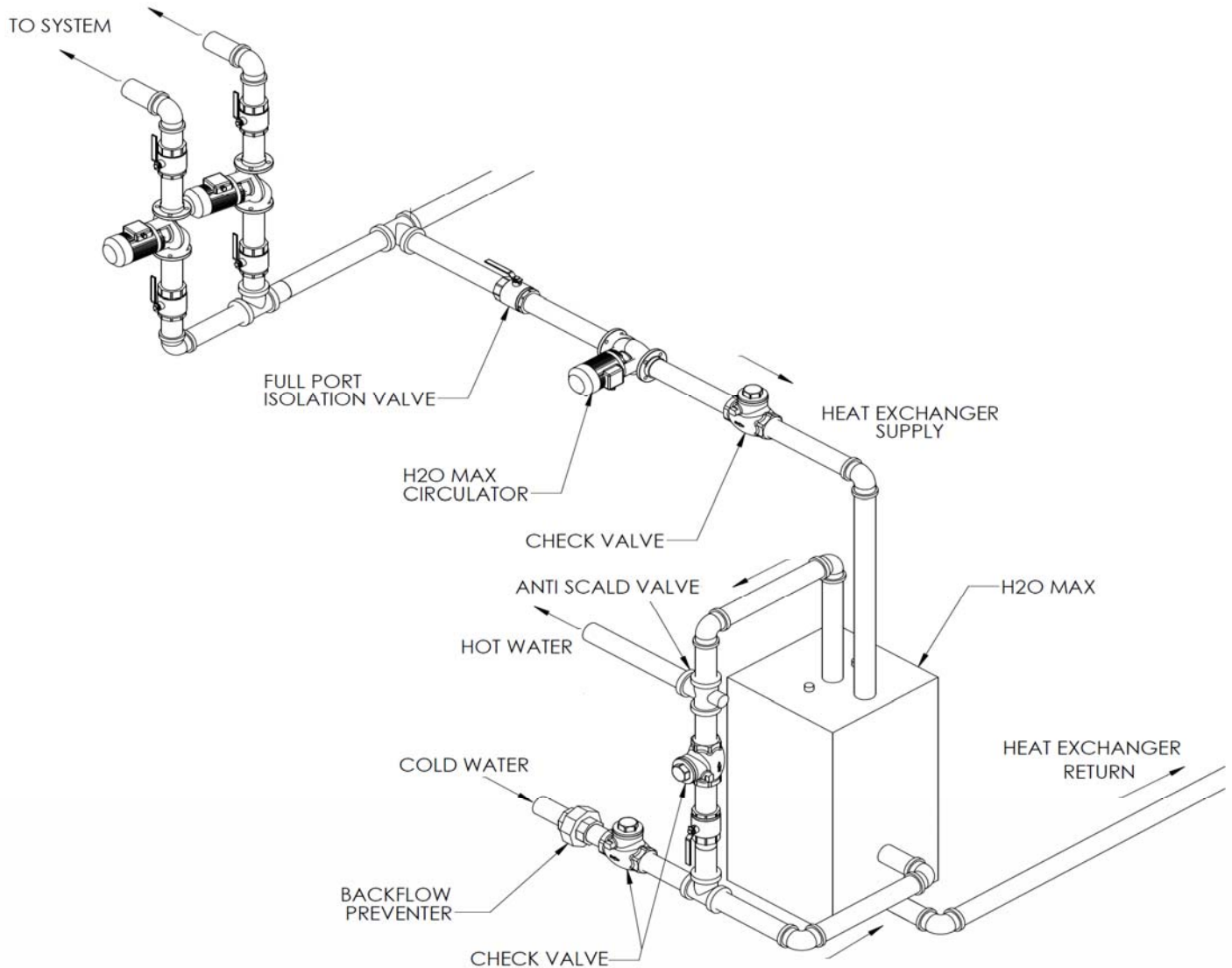
* In the Commonwealth of Pennsylvania for H2OMAX Heat Exchangers, when the heat input per H2OMAX is greater than 200,000 btu/hr, it does not require ASME code construction when relieved by an ASME 15 psig safety relief valve. When this valve is installed, the expansion tank must be of adequate size to handle the extra volume of boiler water inside the H2OMAX tank. Otherwise, the safety relief valve will "blow off" occasionally. Additionally, with the use of this valve, ***it is recommended that the circulator be installed on the boiler return between the H2OMAX and boiler.***

INSTALLATION INSTRUCTIONS

H2OMAX COMMERCIAL HOT WATER HEAT EXCHANGER

RECOMMENDED NEAR UNIT PIPING

ONE (1) H2OMAX HEAT EXCHANGER



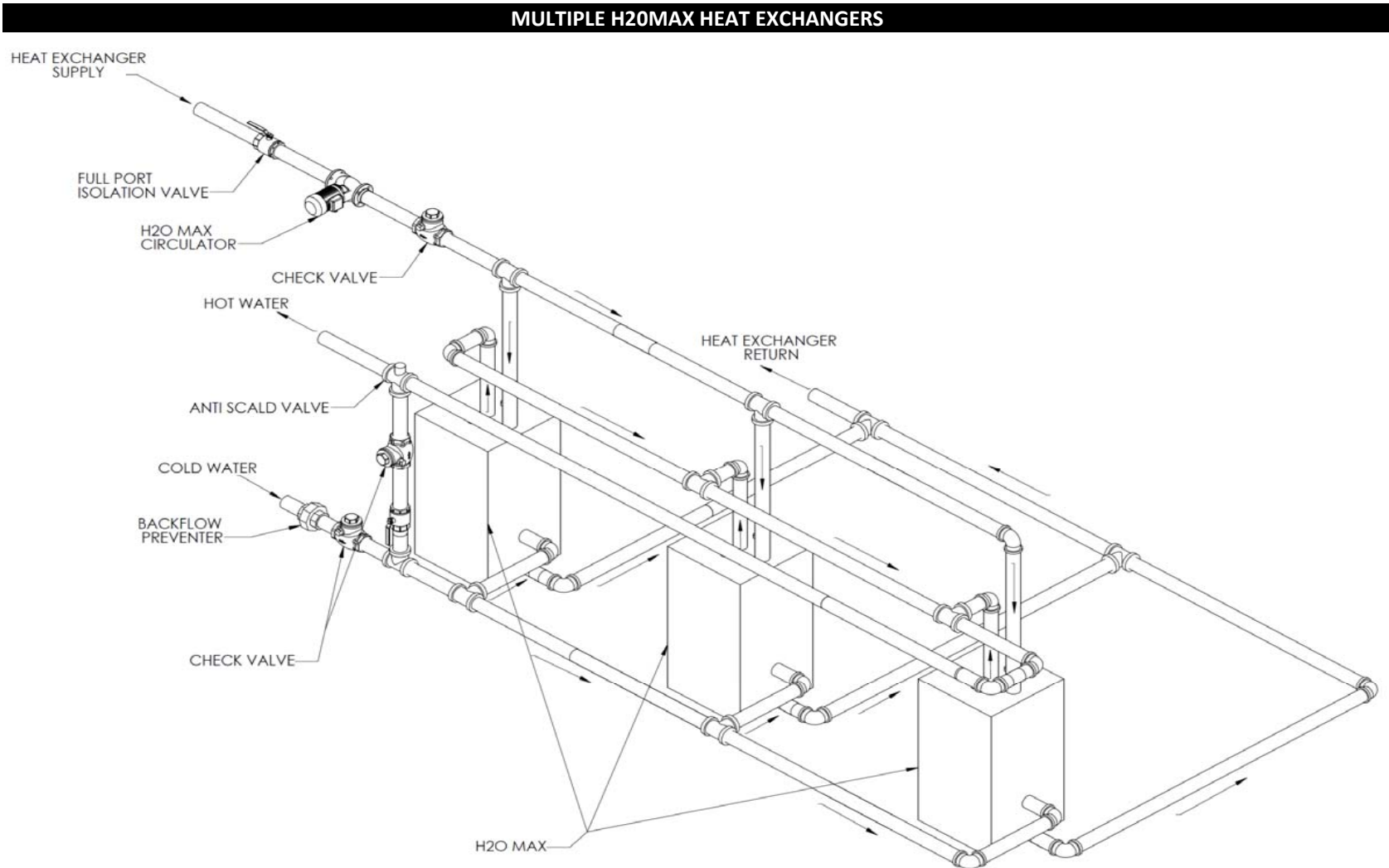
NOTES:

- A) This is a suggested piping configuration. It is the installer's responsibility to confirm with local codes and ordinances for additional requirements.
- B) Refer to "Installing an Anti-Scald Valve" in H2OMAX Commercial Heat Exchanger Installation Manual and valve manufacturer's instructions.

INSTALLATION INSTRUCTIONS

H2OMAX COMMERCIAL HOT WATER HEAT EXCHANGER

RECOMMENDED NEAR UNIT PIPING



NOTES:

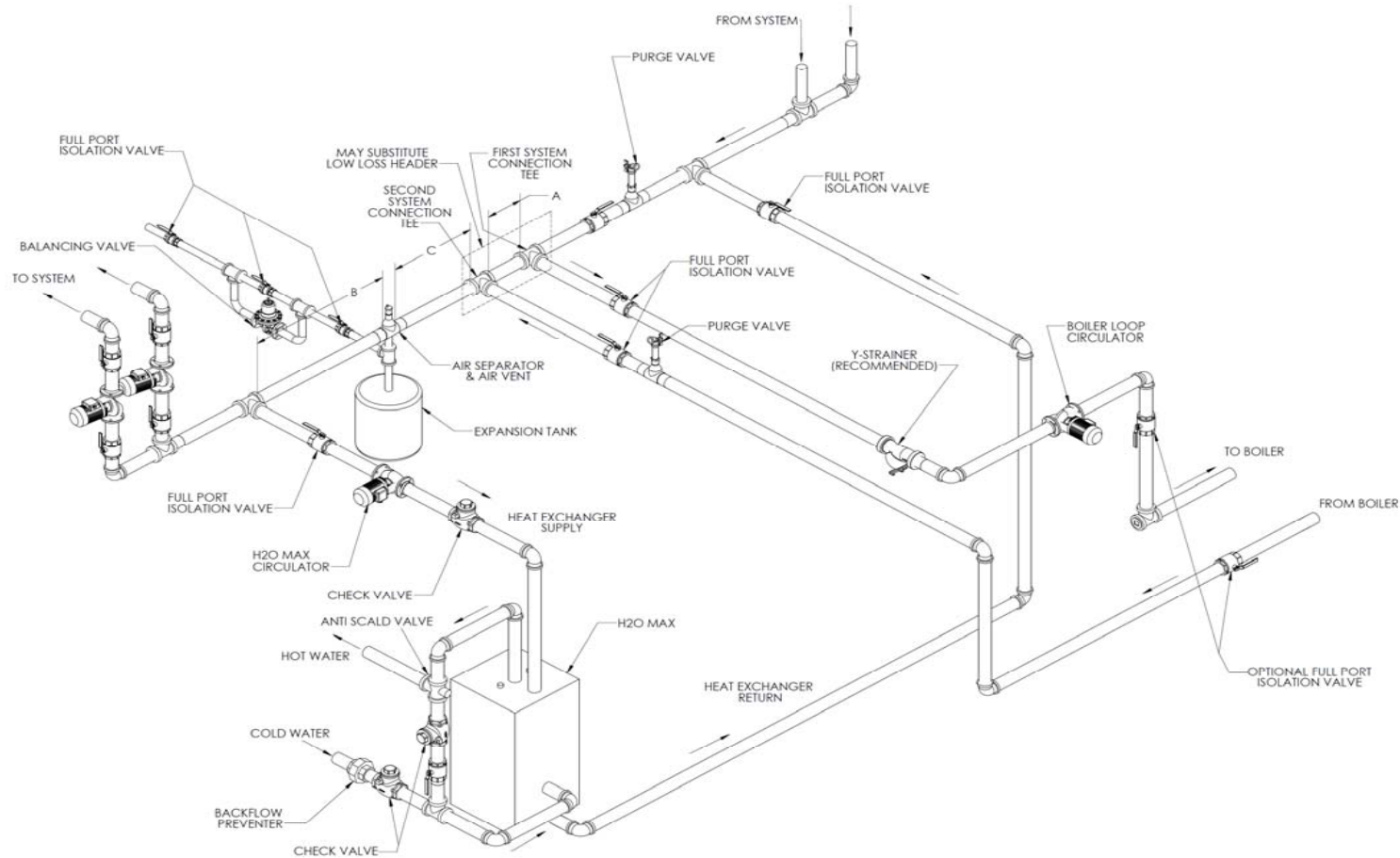
- A) This is a suggested piping configuration. It is the installer's responsibility to confirm with local codes and ordinances for additional requirements.
- B) Refer to "Installing an Anti-Scald Valve" in H2OMAX Commercial Heat Exchanger Installation Manual and valve manufacturer's instructions.

INSTALLATION INSTRUCTIONS

H2OMAX COMMERCIAL HOT WATER HEAT EXCHANGER

RECOMMENDED PIPING WITH HOT WATER BOILERS

ONE (1) HOT WATER BOILER and ONE (1) H2OMAX HEAT EXCHANGER



NOTES:

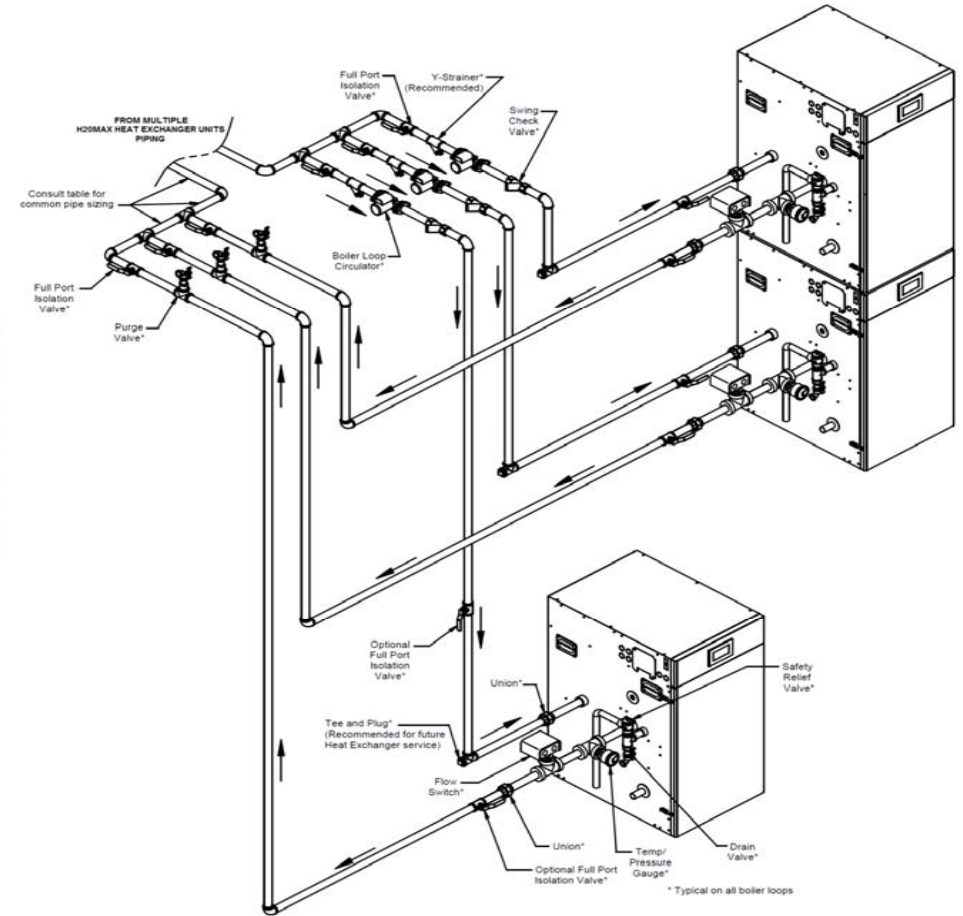
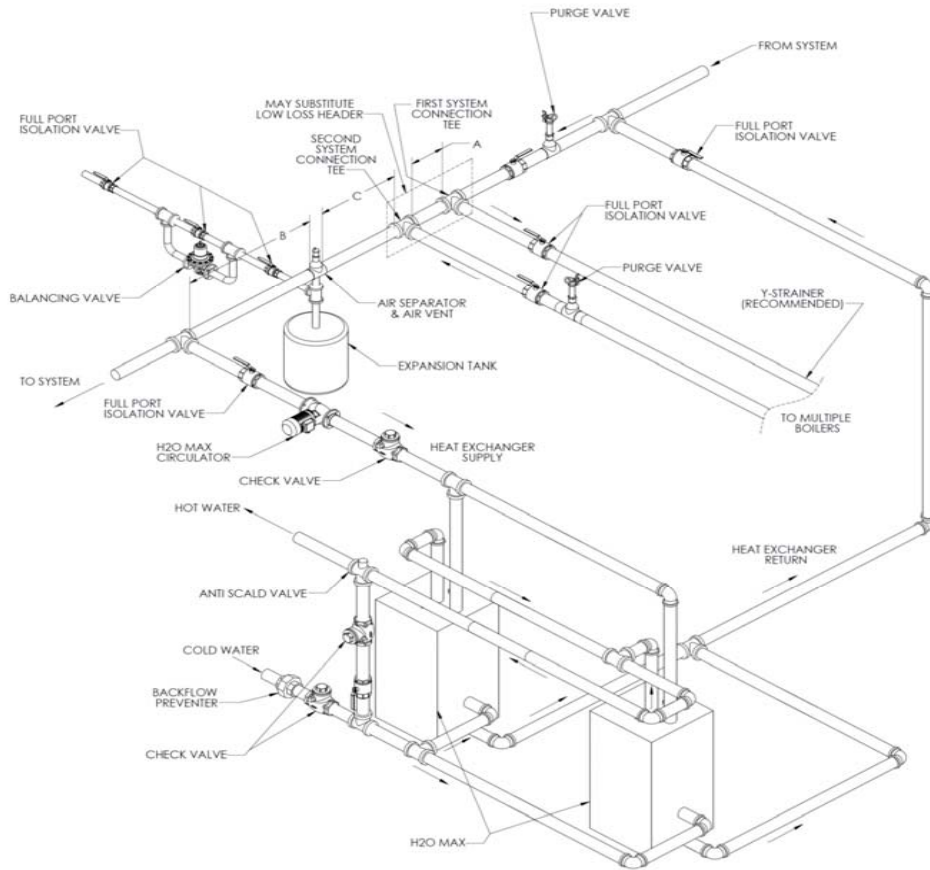
- A) No further apart than 12 inches or four pipe diameters, whichever is smaller.
- B) Keep this distance as short as practical.
- C) At least 18 inches of straight pipe for conventional air scoop.
- D) This is a suggested piping configuration. It is the installer's responsibility to confirm with local codes and ordinances for additional requirements.
- E) Pressure relief valve setting shall not exceed pressure rating of any component in the system.
- F) Boiler Pump must be sized to overcome pressure drop across entire boiler loop.
- G) Refer to "Installing an Anti-Scald Valve" in H2OMAX Commercial Heat Exchanger Installation Manual and valve manufacturer's instructions.

INSTALLATION INSTRUCTIONS

H2OMAX COMMERCIAL HOT WATER HEAT EXCHANGER

RECOMMENDED PIPING WITH HOT WATER BOILERS

MULTIPLE HOT WATER BOILERS and MULTIPLE H2OMAX HEAT EXCHANGERS



NOTES:

- A) No further apart than 12 inches or four pipe diameters, whichever is smaller.
- B) Keep this distance as short as practical.
- C) At least 18 inches of straight pipe for conventional air scoop.
- D) This is a suggested piping configuration. It is the installer's responsibility to confirm with local codes and ordinances for additional requirements.
- E) Pressure relief valve setting shall not exceed pressure rating of any component in the system.
- F) Boiler Pump must be sized to overcome pressure drop across entire boiler loop.
- G) Refer to "Installing an Anti-Scald Valve" in H2OMAX Commercial Heat Exchanger Installation Manual and valve manufacturer's instructions.

INSTALLATION INSTRUCTIONS

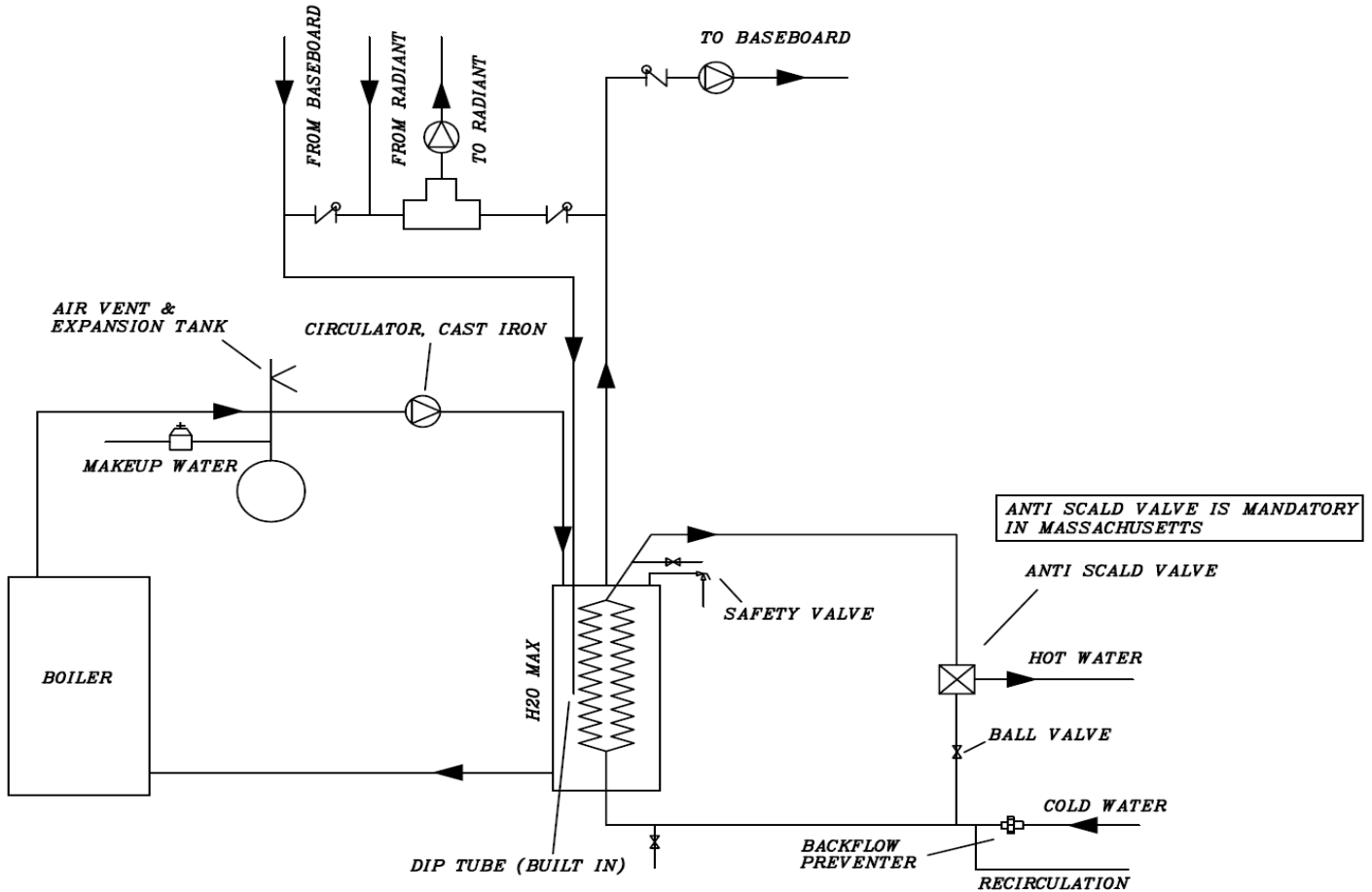
H2OMAX COMMERCIAL HOT WATER HEAT EXCHANGER

ALTERNATIVE PIPING SCHEMATICS WITH HOT WATER BOILER

SCHEMATICS ARE CONCEPTUAL AND ARE USED FOR ILLUSTRATIVE PURPOSES ONLY

ONE (1) HOT WATER BOILER and ONE (1) H2OMAX HEAT EXCHANGER

Domestic Hot Water, Radiator & Baseboard Zones (and Radiant Heating, if applicable) and Buffering Boiler *



* Primarily for Residential Installations

INSTALLATION INSTRUCTIONS

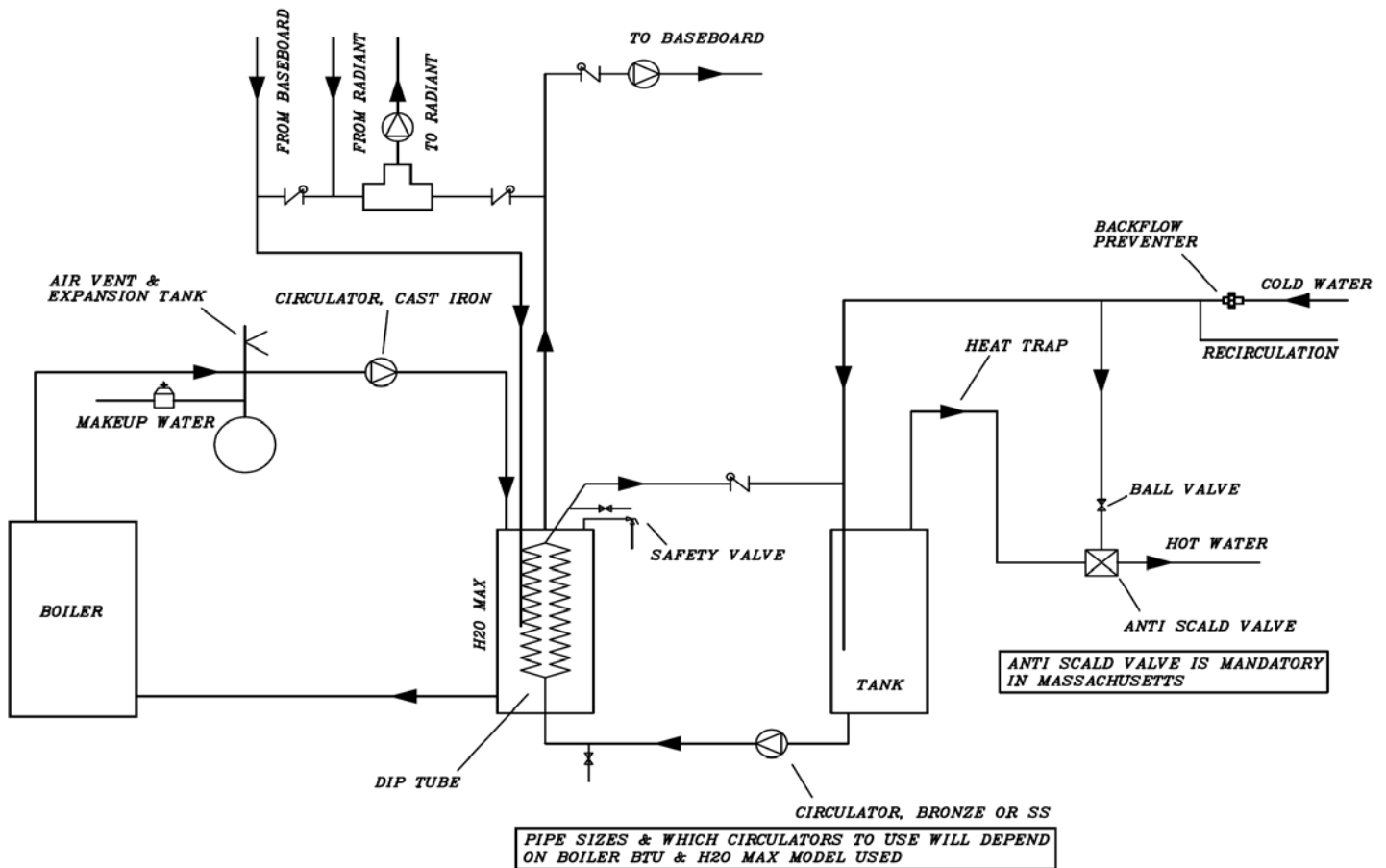
H2OMAX COMMERCIAL HOT WATER HEAT EXCHANGER

ALTERNATIVE PIPING SCHEMATICS WITH HOT WATER BOILER

SCHEMATICS ARE CONCEPTUAL AND ARE USED FOR ILLUSTRATIVE PURPOSES ONLY

ONE (1) HOT WATER BOILER, ONE (1) H2OMAX HEAT EXCHANGER and ONE (1) STORAGE TANK

Domestic Hot Water, Radiator & Baseboard Zones (and Radiant Heating, if applicable) and Buffering Boiler



INSTALLATION INSTRUCTIONS

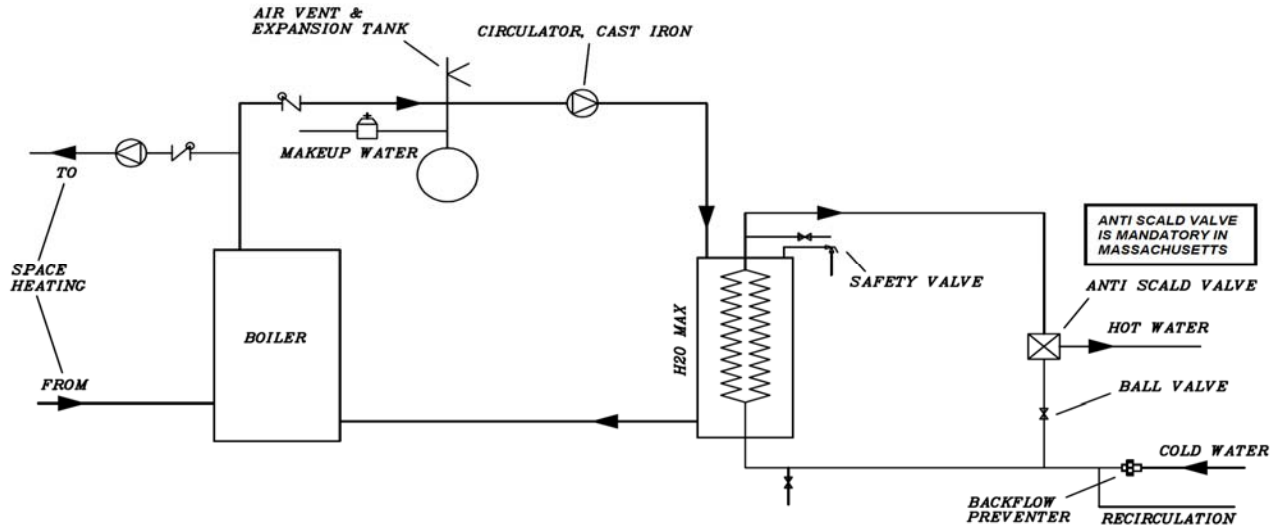
H2OMAX COMMERCIAL HOT WATER HEAT EXCHANGER

ALTERNATIVE PIPING SCHEMATICS WITH HOT WATER BOILER

SCHEMATICS ARE CONCEPTUAL AND ARE USED FOR ILLUSTRATIVE PURPOSES ONLY

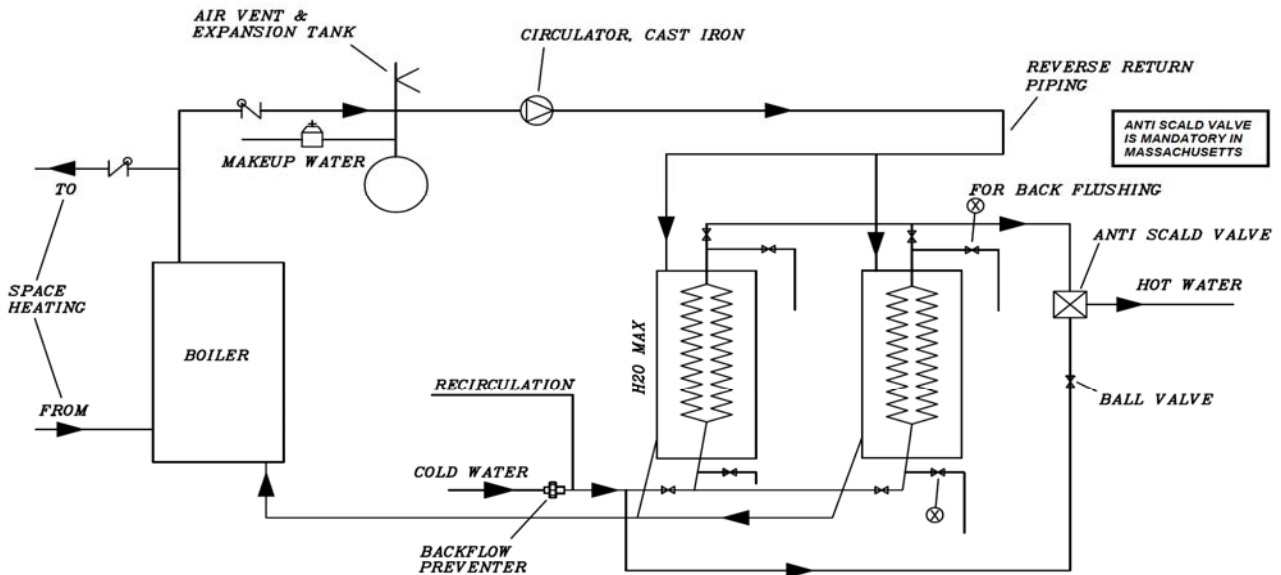
ONE (1) HOT WATER BOILER and ONE (1) H2OMAX HEAT EXCHANGER

Domestic Hot Water and Radiator & Baseboard Zones (and Radiant Heating, if applicable)



ONE (1) HOT WATER BOILER and TWO (2) H2OMAX HEAT EXCHANGERS

Domestic Hot Water and Radiator & Baseboard Zones (and Radiant Heating, if applicable)



INSTALLATION INSTRUCTIONS

H2OMAX COMMERCIAL HOT WATER HEAT EXCHANGER

INSTALLING ANTI-SCALDING VALVE

INSTALLING AN ANTI-SCALD VALVE: It is highly recommended to install an anti-scald (3-way mixing) valve (conforming to ASSE 1017) with all H2OMAX systems for two reasons:

1) To maximize boiler operating efficiency. To obtain the greatest benefit from a boiler/H2OMAX unit combination (particularly with low mass boiler) the boiler should operate at maximum efficiency. This happens when a boiler does not short cycle. Such an operating environment can be established by maximizing H2OMAX unit's thermal storage capacity (ie. operating H2OMAX unit at a relatively high temperature and using an anti-scald valve to keep the domestic water temperature within the normal use range).

2) H2OMAX units can produce very high temperature water which could result in scalding. Installing an anti-scald valve will prevent this from happening. To maximize protection from possible scalding, many local plumbing codes require anti-scald valves be installed on all water heaters. Get into the habit of opening the cold water faucet first and then the hot water one.

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INSTALLATION INSTRUCTIONS

H2OMAX COMMERCIAL HOT WATER HEAT EXCHANGER

INSTALLATION WITH LOW PRESSURE STEAM BOILERS

GENERAL: The general installation process is similar to hot water boilers but some specifics related to low pressure steam boilers must be taken into account. Boiler water in the piping and H2OMAX unit may be at a higher level than the water level in the steam boiler. It will not flow back into the boiler if all air is eliminated from the entire boiler/H2OMAX unit loop.

H2OMAX units can be installed with low pressure steam boilers by using the water below the steam as boiler water supply for H2OMAX units. However, some precautions must be taken:

- 1) There should be no air vents on the system. An expansion tank is not needed.
- 2) H2OMAX units must be isolated from the boiler with ball valves to fill it with water.
- 3) A ball valve should be placed on the boiler supply pipe T to let the air out of the H2OMAX tank during the fill process. (See schematic on the next page) Note: the pressure relief valve could also be used for this purpose. However, the seating must be perfect, else air will get into the system.
- 4) The offtake for boiler water supply must be well below the water line in the boiler (at least 9 inches). If it is too close to the water level, the circulator may suck air or steam with the boiler water when it starts up. This air could accumulate in the H2OMAX tank, reducing performance and causing the tank to rust and eventually to fail. An indication that this is occurring is the water level in the sight glass bobbing up and down when the circulator is running. To eliminate this problem, the offtake should be moved further below the water line in the boiler. If this is not possible, one of the ball valves (preferably downstream of the circulator for the H2OMAX unit zone) should be shut down somewhat to minimize the movement of water in the sight glass. Be careful not to close the ball valve too much as this will restrict the flow of boiler water to the H2OMAX tank, lowering its performance.
- 5) Sludge - Sludge tends to accumulate in steam boilers over time. (Add conditioner annually to control acidity and sludge formation.) This sludge may also be pumped into H2OMAX unit via the circulator and accumulate at the bottom of the H2OMAX tank. To prevent sludge accumulation in the H2OMAX unit : a) the boiler should be flushed before H2OMAX unit is installed and at the beginning of each heating season; and b) a strainer/filter must be installed on the boiler water supply to H2OMAX unit and cleaned at regular intervals. (See schematic on the next page). Accumulation of sludge in H2OMAX unit will cause the H2OMAX tank to fail. The warranty does not cover failure due to sludge accumulation. Check for any sludge accumulation at regular intervals by opening the tank drain on H2OMAX unit. If sludge is present, flush the boiler and H2OMAX tank and make sure the strainer is clean. NOTE: Be very careful when draining the tank as this water is very hot. Isolate H2OMAX unit from the boiler by closing the ball valves, refill with water and evacuate all air.
- 6) Water in steam boilers tends to become acidic. Boiler water conditioner should be added to the boiler water annually to keep acidity within the normal Environmental Protection Agency (EPA) recommended range of between pH 6.5 - 8.5. If this is not done, the warranty will be voided.

ANTI-SCALD VALVE (Supplied by others): It is highly recommended to install an anti-scald (3-way mixing) valve with all H2OMAX systems. Anti-scald valves are mandatory in the Commonwealths of Massachusetts and Pennsylvania*.

* In the Commonwealth of Pennsylvania for H2OMAX Heat Exchangers, when the heat input per H2OMAX is greater than 200,000 btu/hr, it does not require ASME code construction when relieved by an ASME 15 psig safety relief valve. When this valve is installed, the expansion tank must be of adequate size to handle the extra volume of boiler water inside the H2OMAX tank. Otherwise, the safety relief valve will "blow off" occasionally. Additionally, with the use of this valve, **it is recommended that the circulator be installed on the boiler return between the H2OMAX and boiler.**

INSTALLATION INSTRUCTIONS

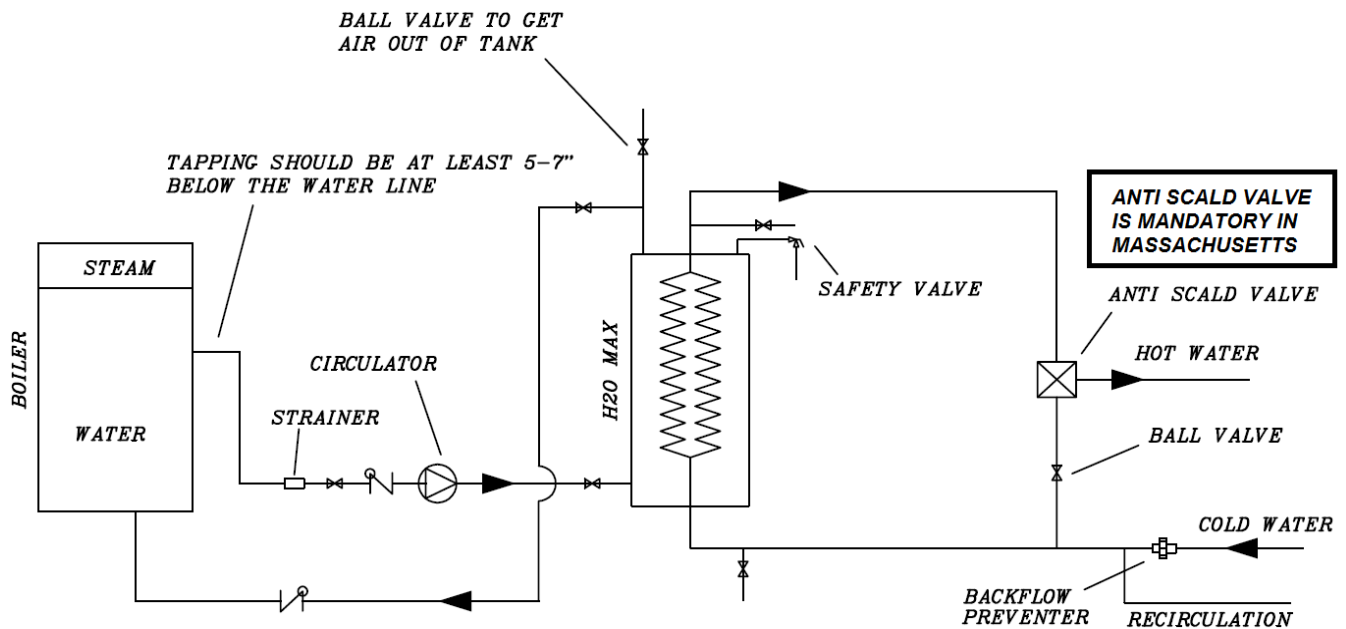
H2OMAX COMMERCIAL HOT WATER HEAT EXCHANGER

RECOMMENDED PIPING SCHEMATIC WITH LOW PRESSURE STEAM BOILERS

SCHEMATICS ARE CONCEPTUAL AND ARE USED FOR ILLUSTRATIVE PURPOSES ONLY

ONE (1) LOW PRESSURE STEAM BOILER and ONE (1) H2OMAX HEAT EXCHANGER

Domestic Hot Water



INSTALLATION INSTRUCTIONS

H2OMAX COMMERCIAL HOT WATER HEAT EXCHANGER

PRESSURE LOSS

BOILER WATER FLOW (GPM)	PRESSURE LOSS (FEET OF HEAD)			
	H26	H48	H72	H119
10	0.4	0.1	0.1	----
15	1.0	0.3	0.2	----
20	1.7	0.6	0.3	0.1
25	2.7	0.9	0.5	0.2
30	3.9	1.3	0.6	0.3
35	----	1.8	0.9	0.4
40	----	2.3	1.2	0.5
45	----	2.9	1.5	0.6
50	----	3.6	1.9	0.7
55	----	----	2.3	0.8
60	----	----	2.8	1.0
65	----	----	3.3	1.2
70	----	----	----	1.4
80	----	----	----	1.8
90	----	----	----	2.3
100	----	----	----	2.8
110	----	----	----	3.4

INSTALLATION INSTRUCTIONS

H2OMAX COMMERCIAL HOT WATER HEAT EXCHANGER

CIRCULATOR SIZING

Circulator or pump size is calculated on the basis of how much heat must be transferred from the boiler to the domestic cold water.

CIRCULATOR OR PUMP FLOW

Boiler Output	=	BTU	}
Boiler Temperature Rise (Delta T) (Temperature difference between boiler water supply & return)	=	DT °F	

EXAMPLE: (1 Qty, H119 Unit)

760,000 BTU
30 °F

CIRCULATOR OR PUMP FLOW FORMULA

$\frac{(\text{ BTU })}{(\text{ DT}^\circ\text{F} \times 8.33 \times 60)}$	=	GPM	}
Flow through each H2OMAX	=	$\frac{\text{GPM}}{\text{Unit Qty}}$	

$\frac{760,000 \text{ BTU}}{(30^\circ\text{F} \times 8.33 \times 60)}$	=	51 GPM
$\frac{51 \text{ GPM}}{(1 \text{ qty}) \text{ Model H119}}$	=	51 GPM

CIRCULATOR OR PUMP FLOW	→ 51 GPM
--------------------------------	-----------------

TOTAL PRESSURE LOSS

Pressure loss through H2OMAX (See "Pressure Loss Table")	=	ft/hd	}
Pressure loss through piping	=	$\frac{\text{ft/hd}}{\quad}$	
TOTAL PRESSURE LOSS (Add H2OMAX and Piping pressure losses together)	=	ft/hd	

Through H2OMAX (55 GPM for H119)	=	0.8 ft/hd
Through piping *	=	<u>4.5 ft/hd</u>
TOTAL PRESSURE LOSS	=	5.3 ft/hd

* Based on 20 feet of 2-1/2" piping and (4) 90° elbows

TOTAL PRESSURE LOSS	→ 5.3 ft/hd
----------------------------	--------------------

CIRCULATOR NEEDED:

Circulator or Pump Flow	=	GPM	}
Total Pressure Loss	=	ft/hd	

Flow through H119	=	51 GPM
Total Pressure Loss	=	5.3 ft/hd

INSTALLATION INSTRUCTIONS

H2OMAX COMMERCIAL HOT WATER HEAT EXCHANGER

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
No hot water	Boiler does not operate	- Press reset button - Check fuse - Check main cut off switch
	Circulator does not operate	- Check power supply
	Zone valve does not open	- Check power supply
	Improper setting on aquastat	- Turn aquastat to a higher temperature
	Electrical Problem	- Check relay, fuse and replace - Reset circuit breaker (if applicable) - Check power supply - Check all wiring
	Inoperative aquastat	- Set aquastat to higher temperature and see if circulator starts to operate. - Replace aquastat if needed
	Air trapped in H2OMAX tank	- Open safety valve on top of H2OMAX to let air out
Not enough hot water	Aquastat set too low	- Turn aquastat to a higher setting & install mixing valve
	Demand greater than boiler output	- Check sizing calculation
	Defective aquastat	- Replace
	Insufficient boiler output (Btu) with no priority for DHW	- Reduce hot water flow rate. Install priority switch. Install mixing valve
	Air trapped in H2OMAX tank	- Open pressure relief valve on top of H2OMAX to let air out
Water temperature starts to drop	Aquastat set too low	- Set aquastat to higher temperature
	Boiler undersized, no priority for DHW	- Install priority switch
	Demand for hot water greater than boiler Btu output	- Check boiler/H2OMAX sizing calculations - Reduce hot water flow rate, check boiler/H2OMAX sizing calcs
	Water pressure is very high	- Install pressure reducing valve. Set to 60-65 psig
Water temperature too hot	Aquastat set too high	- Set aquastat to lower temperature - Install and set mix valve to lower temperature - Check aquastat operation. (As aquastat is set to lower temperature, circulator should stop)
	Defective aquastat	- Replace aquastat
	Check mix valve	- Clean mix valve
	Improper plumbing	- Check plumbing against installation instructions
	Improper system wiring	- Check wiring
Sound of rushing water when circulator starts	Air in piping and/or tank	- Open safety valve to let air out. Install air vent on last elbow in piping leading into the tank
Gurgling sounds in H2OMAX tank	Air in tank	- Open safety valve to let air out. Install air vent on last elbow in piping leading into the tank
Coils making a noise	Air in tank	- Open safety valve to let air out
Surges of hot/cold water in shower	Shower fixture problem	- Check pressure balancing valve operation
Pressure relief valve opens occasionally	Pressure on boiler side too high	- Lower boiler pressure - Check pressure relief valve operation - Check if expansion tank has failed
Pressure relief valve discharges often	Pressure on boiler side too high	- Could indicate coil failure. Call service contractor for evaluation
Boiler cycles too often	Boiler high limit set too low	- Set high limit higher
	Electrical wiring	- Check aquastat/boiler control wiring
	Boiler control	- Check boiler control operation
	Aquastat	- Check aquastat operation
Tank leak	Determine location	- Check tank drain for leak - Call service contractor to determine location (aquastat well not tight, safety valve leaking, temp/pressure gauge not tight, tank leak)

LIMITED WARRANTY

H2OMAX COMMERCIAL HOT WATER HEAT EXCHANGER

In residential service the Manufacturer warrants to the original retail Purchaser that the tank and coil assembly shall be free of leaks for fifteen (15) years in the home in which H2OMAX was originally installed, provided that conditions a), b) and c), as defined below, (acidity, particulate matter and water hardness) are met. Residential service shall mean use in dwellings with no more than two apartments.

In commercial service the Manufacturer warrants the tank and copper coil assembly for ten (10) years, the first five (5) years in full and years six (6) through ten (10) prorated at 20% each year of the prevailing retail price, provided that conditions a), b) and c), as defined below, (acidity, particulate matter and water hardness) are met. Commercial service shall mean use in dwellings other than residential service.

- a) the acidity of the water is within the normal Environmental Protection Agency (EPA) recommended range of between pH 6.5 - 8.5;
- b) the domestic water does not contain abnormal levels of particulate matter; and
- c) water hardness does not exceed 10.5 gpg.

Warranty will also be voided when installed with low pressure steam boilers if sludge is allowed to accumulate in H2OMAX tank and boiler water acidity is outside the levels indicated above.

In the event of tank leakage due to defective material or workmanship, such a leak having been verified by an authorized representative, Manufacturer will repair or replace the failed unit with a comparable H2OMAX unit available at the time of replacement at no cost to the original retail Purchaser, except as set forth in this Warranty. The repaired or replacement unit may have changes in design, material or construction which in the judgement of Manufacturer constitute an improvement of former practice. The original Purchaser is responsible for all costs associated with the removal and reinstallation, shipping and handling to and from Manufacturer. The replacement unit will be warranted for the remaining portion of the original Warranty.

Component Parts Warranty

Controls are warranted by their respective original equipment manufacturers for a period of one (1) year.

Exclusions And Limitations

This Warranty shall apply only if:

1. H2OMAX is installed according to the installation instructions provided with the unit.
2. Any failure or malfunction does not result from improper or negligent operation, accident, abuse (including freezing or water/flood), misuse, unauthorized alteration or improper repair or maintenance.
3. The unit is used in the United States.
4. The consumer presents a copy of the original sales/installation receipt at the time claim is filed.
5. This Warranty shall be void if the manufacturer's tag has been tampered with or removed from the H2OMAX without written permission from Thermal Solutions.

Manufacturer shall not be liable for incidental or consequential damages. Some states do not allow the exclusion or limitation of consequential damages, so the above limitation or exclusion may not apply to you. You should be aware that you may have other rights that vary from state to state.

